UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7054

CSAH 22

OVER

STURGEON RIVER

DISTRICT 1 - ST. LOUIS COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 10)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure unit inspected at Bridge No. 7054, Pier 2, was found to be in good to satisfactory condition. The concrete of the pier exhibited light to moderate scaling and several areas of section loss; however, there were no structurally significant defects observed. The channel bottom appeared stable with no evidence of significant scour. A light accumulation of timber debris was observed around both columns of Pier 2.

INSPECTION FINDINGS:

(A) An area of section loss along the beveled sides of the upstream column, extending from the waterline to 2.5 feet above the waterline with a maximum penetration of 3 inches, was observed on the upstream side of the upstream column of Pier 2. Corroded reinforcing steel was exposed.

(B) An area of section loss extending from 2 foot above the waterline to the waterline with a maximum penetration of 4 inches was observed on the upstream face of the downstream column of Pier 2. Corroded reinforcing steel was exposed.

(C) The top portion of the horizontal strut connecting the columns of Pier 2 was exposed from the upstream column to 4 feet downstream and from the downstream column to 4 feet upstream. The strut was covered by the channel bottom material across the center portion of the pier.

(D) An area of section loss was observed along the downstream end of the downstream column of Pier 2 from 3 inches above the waterline to 6 inches below the waterline with a maximum penetration of 2 inches. Corroded reinforcing steel was exposed.

(E) A light accumulation of 3 inch diameter and smaller timber debris was present on the channel bottom all around Pier 2.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7054

Feature Crossed: Sturgeon River

Feature Carried: CSAH 22

Location: District 1 - St. Louis County

Bridge Description: The superstructure consists of a three span, multiple steel stringer bridge supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The piers are numbered 1 and 2, starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 25, 2007

Weather Conditions: Sunny, 50^{o} F

Underwater Visibility: 0.5 feet

Waterway Velocity: 2.0 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 2.

General Shape: The pier consists of two elongated hexagonal columns supporting a rectangular pier cap. The pier columns are supported on a rectangular footing and are connected by a horizontal concrete diaphragm/strut located above the footing.

Maximum Water Depth at Substructure Inspected: Approximately 3.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the bridge seat at the downstream end of Pier 2.

Water Surface: The waterline was approximately 16.4 feet below reference. Assumed Water Elevation = 83.6.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No

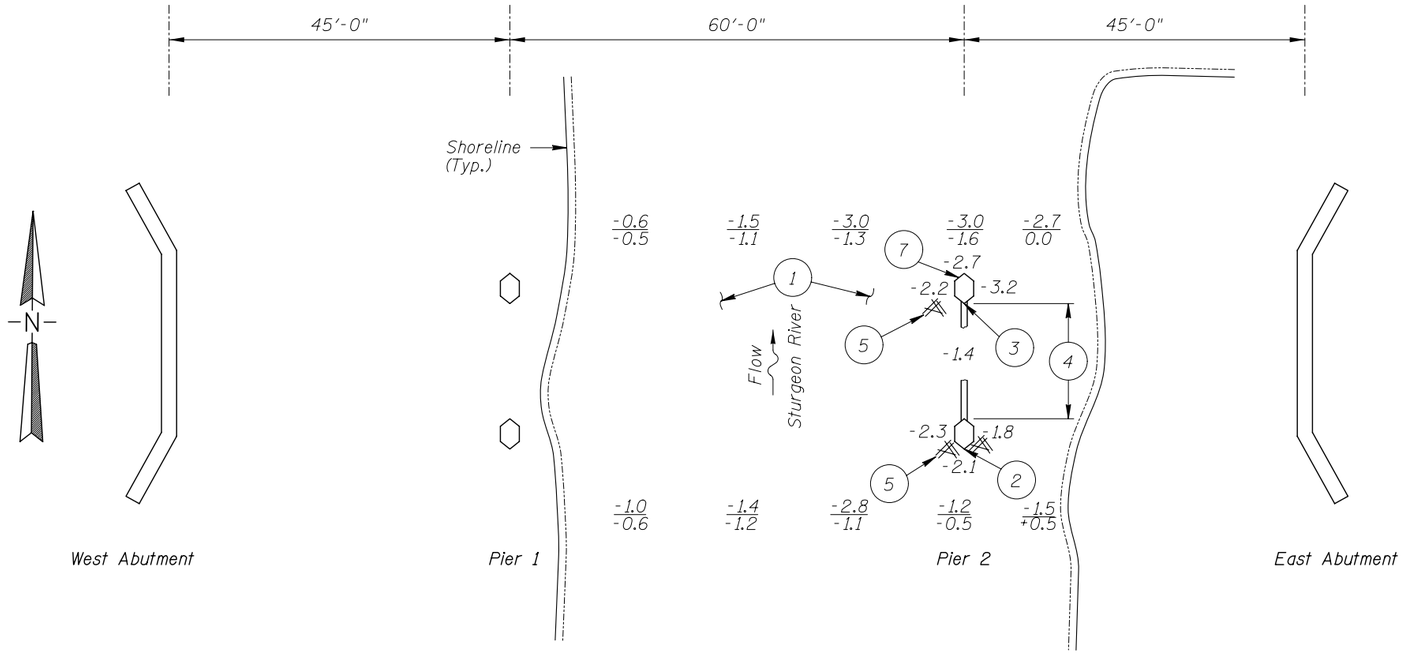
Photograph 1. Overall View of the Structure, Looking North.

Photograph 2. View of Pier 2, Looking East.

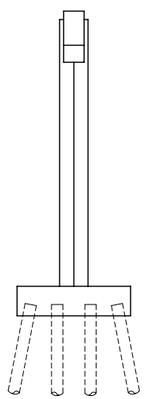
Photograph 3. View of the Downstream Column of Pier 2, Looking Northeast.

Photograph 4. View of the Downstream Column of Pier 2, Looking Southwest.

Photograph 5. View of the Upstream Column of Pier 2, Looking Northeast.



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Pier 2 was inspected underwater.
2. At the time of inspection on August 25, 2007, the waterline was located 16.4 feet below the top of cap at the downstream end of Pier 2. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 83.6.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of silty sand with 0.5 to 1 foot of probe rod penetration.

(2) An area of section loss along the upstream column bevels was observed from the waterline to 2.5 feet above the waterline with a maximum penetration of 3 inches. Corroded reinforcing steel exposed (20% section loss on vertical bars and 15% section loss on horizontal bars).

(3) An area of section was observed on the upstream face and east and west faces of the downstream column of Pier 2 from 2 feet above the waterline to the waterline with a maximum penetration of 4 inches. Corroded reinforcing steel was exposed (10% section loss).

(4) The top portion of the horizontal strut was exposed from the upstream column to 4 feet downstream and from the downstream column to 4 feet upstream, and was covered by the channel bottom material along the center of the strut.

(5) A light accumulation of 3-inch-diameter and smaller timber debris was observed all along Pier 2.

(6) An area of section loss along the downstream end of the downstream column of Pier 2 was observed from 3 inches above the waterline to 6 inches below the waterline with a maximum penetration of 2 inches. Corroded reinforcing steel was exposed (10% section loss).

Legend

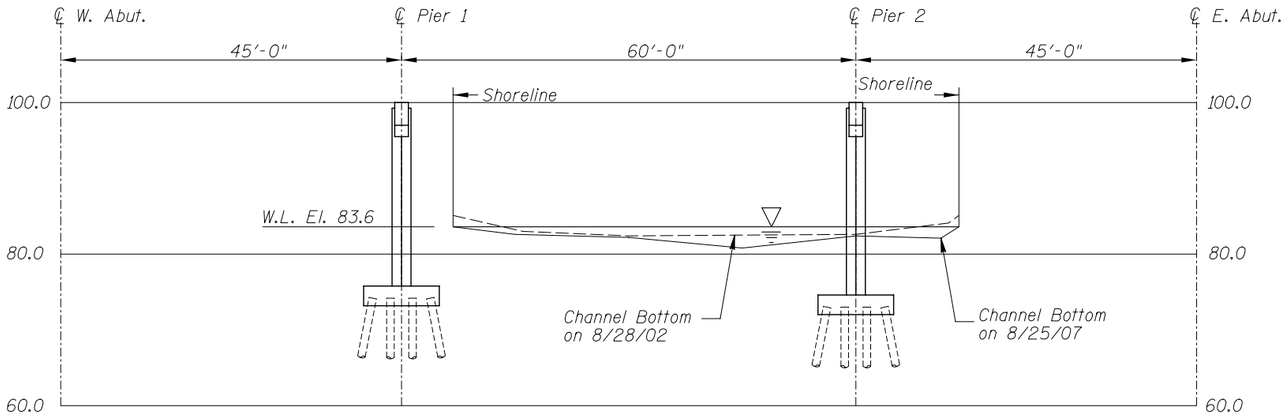
-1.8	Sounding Depth (8/25/07)
-2.0	Sounding Depth (8/28/02)
	Tinber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

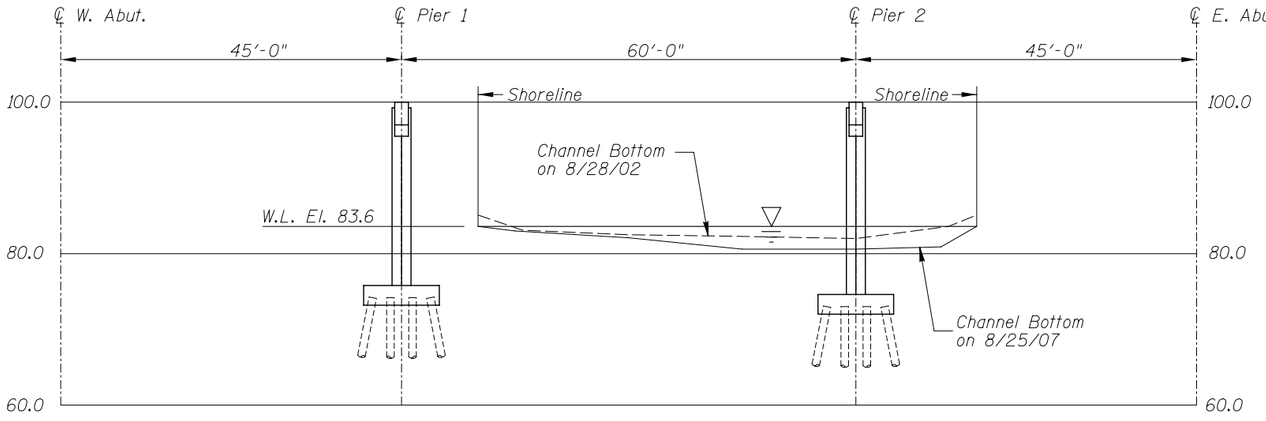
STRUCTURE NO. 7054
OVER THE STURGEON RIVER
DISTRICT 1, ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUG. 2007
Checked By: MDK		Scale: NTS
Code: 52210010		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 7054
OVER THE STURGEON RIVER
DISTRICT 1, ST. LOUIS COUNTY

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUG. 2007
Checked By: MDK		Scale: 1"=20'
Code: 52210010		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 25, 2007
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.
BRIDGE NO: 7054 WEATHER: Sunny, 50° F
WATERWAY CROSSED: Sturgeon River
DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR
_____ OTHER_____
PERSONNEL: John J. Loftus, Valerie Roustan
EQUIPMENT: SCUBA, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera
TIME IN WATER: 4:50 p.m.
TIME OUT OF WATER: 5:05 p.m.
WATERWAY DATA: VELOCITY 0.5 f.p.s
VISIBILITY 2.0. feet
DEPTH 3.0 feet maximum at Pier 2.
ELEMENTS INSPECTED: Pier 2
REMARKS: Overall, the concrete was in good to satisfactory condition with some light to moderate scaling. The upstream column exhibited section loss from the waterline to 2.5 feet above the waterline, with a maximum penetration of 3 inches along the beveled sides of the upstream nose. Also, there was an area of section loss at the downstream side of the downstream column from 3 inches above the waterline to 6 inches below the waterline. At the upstream face and east and west faces of the downstream column, there was an area of section loss with a maximum penetration of 4 inches extending from 2 feet above the waterline to the waterline. All of the areas of section loss exhibited exposed and corroded reinforcing steel. The concrete strut connecting the two columns was exposed along the length of the pier, with the exception of a 4 foot section along the middle of the pier. There was light timber drift on the channel bottom around Pier 2.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7054
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Sturgeon River

INSPECTION DATE August 25, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 2	3.0’	N	5	N	9	N	5	7	7	8	7	7	5	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete was in good to satisfactory condition with some light to moderate scaling. The upstream column exhibited section loss from the waterline to 2.5 feet above the waterline, with a maximum penetration of 3 inches along the beveled sides of the upstream nose. Also, there was an area of section loss at the downstream side of the downstream column from 3 inches above the waterline to 6 inches below the waterline. At the upstream face and east and west faces of the downstream column, there was an area of section loss with a maximum penetration of 4 inches extending from 2 feet above the waterline to the waterline. All of the areas of section loss exhibited exposed and corroded reinforcing steel. The concrete strut connecting the two columns was exposed along the length of the pier, with the exception of a 4 foot section along the middle of the pier. There was light timber drift on the channel bottom around Pier 2.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.